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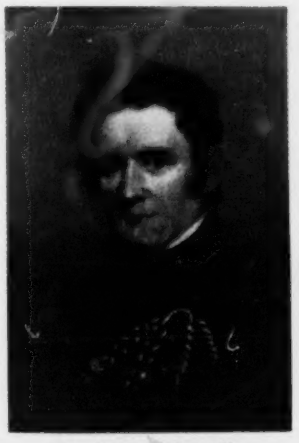
ABSTRACT

The National Library of Medicine was established 135 years ago in the office of the Army's first surgeon general. Almost from the beginning the Library served as a national resource for the medical profession although it was not officially so designated until 1956. This report reveals some of the highlights of the National Library of Medicine's service during the 135th anniversary year. It recounts the accomplishments of its diversified professional staff of more than 450 library and biomedical scientists, physicians, medical educators, historians, literature analysts and translators, computer and electronic communications engineers, and the many persons working in their support. It describes the expanding progress both of established services and developing programs toward their goal of improving access to useful information and new medical knowledge for all who are dedicated to the prevention and treatment of disease and disability. (Author)

NATIONAL LIBRARY OF MEDICINE

THE EARLY YEARS

In 1836 the U.S. Army's first surgeon general included an item in his estimate of official expenditures for the following year that read: "Medical Books for Office, $150." Viewed retrospectively, this commitment by Dr. Joseph Lovell of nearly seven per cent of his annual office budget for this purpose may have been the most significant decision of his professional career.



Dr. Joseph Lovell

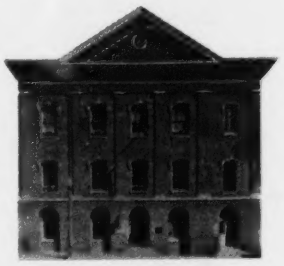
For it is from that year and the bulging bookshelves in Lovell's two-room office in a long-forgotten building in Washington City that the National Library of Medicine officially traces its historic origins. No medical prophet could have foreseen the inevitable course that followed until now, nearly a century and a half later, this great library holds the most prestigious and important collection of health sciences literature ever assembled.

A Bostonian and Harvard graduate, Lovell had served as an Army medical officer for only six years when in 1818 at the age of 29 he was appointed surgeon general, a new staff position in Washington established in a Congressional reorganization of the Army. He initiated the policy of providing his officers in the field, as well as those assigned to hospitals, with medical textbooks and professional journals. Copies were also retained in his office for the use of his small staff.

By 1840 Lovell's successor, Dr. Thomas Lawson, listed "some 130 titles and about 200 volumes" in a handwritten report by a member of his staff that is now a precious archive, "A Catalogue of Books in the Library of the Surgeon General's Office." Lovell's random collection of books was officially a library. Actually it became a mobile library that accompanied the surgeon general's office around early Washington in its frequent moves to borrowed or rented quarters, sometimes in private dwellings.

Riggs Bank Building

During Lawson's 25-year tenure as surgeon general—the longest on record—an increasing number of expenditures for medical books, journal subscriptions, bindings, and bookcases began to appear in his office records. When the first printed catalog of the Library's holdings appeared in 1864 it listed 1,365 volumes under nine classes of literature, and included the date and place of publication of each title. By this time the surgeon general's office was in a brick building, formerly a residence, adjacent to the Riggs Bank on the northwest corner of Fifteenth Street and Pennsylvania Avenue, N.W. The Library occupied the front parlor of the house.



Ford's Theater

After the assassination of President Lincoln in Ford's Theater on April 14, 1865, the government bought the ill-fated three-story building and assigned it to the War Department as an annex of the surgeon general's office. The structure that was to become a Lincoln shrine was refurbished to provide quarters and facilities for a new medical museum, a chemical laboratory, mortuary records, and the books and periodicals of the surgeon general's library, now numbering more than 2,000 volumes. The library had found its first "permanent" home and would not move again for 20 years.

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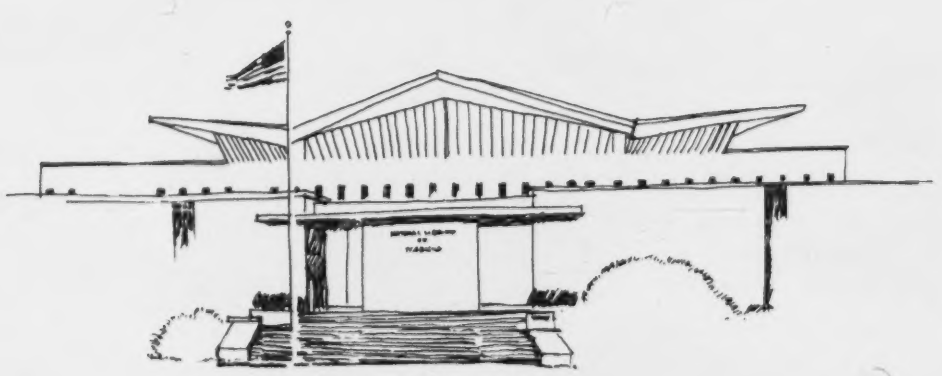
THE NATIONAL LIBRARY OF MEDICINE

135th ANNIVERSARY REPORT 1836 - 1971



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HIGHLIGHTS OF ACTIVITIES

	FY 1969	FY 1970	FY 1971
Size of Collections	1,272,355	1,312,956	1,347,521
Additions to Collections	33,010	36,637	34,565
Reader Requests Filled	82,412	78,779	83,585
Reference Services Provided	24,205	21,702	20,286
Readers and Visitors	29,302	27,186	23,782
Interlibrary Loans	117,049	100,611	102,559
Serial Titles Received	22,918	20,964	22,161
Journal Articles Indexed	210,602	210,000	224,619
Literature Searches Distributed	15,475	20,740	23,717
Recurring Bibliographies	16	18	23
Professional and Technical Staff	470	461	462
Projects Supported by Grants	483	498	548
Appropriations	$18,160,000	$19,573,000	$21,436,000

INTRODUCTION

When the National Library of Medicine was established 135 years ago in the office of the Army's first surgeon general, American medical literature was in its infancy. Only 11 medical journals were being published in the United States, the survivors of 47 launched following the Revolutionary War, and American physicians were authors of less than a score of textbooks and treatises a year. This is reflected in the Library's first "catalog of books," compiled four years after its inception in 1836, that included at least 10 of these journals and many of the books among its 228 volumes. Today the total collections exceed 1,300,000 items.

Almost from the beginning the Library served as a national resource for the medical profession although it was not officially so designated until 1956. Ably directed through the years by dedicated physicians, it grew with the literature and advances of medicine, as the cover notes reveal. Ten years ago an historic milestone was reached in the dedication of the modern building the Library now occupies. The date was December 14, 1961.

Within the respective spans of these two significant anniversaries, medicine gained the status of a scientific profession and the medical library became a learning center for its practitioners. This came about, in great part, because of a continuing proliferation of new clinical discoveries applicable in the prevention, diagnosis, and treatment of disease and disability, and through the adoption of major technological developments in the support and prolongation of human life. In the nearly century and a half of the existence of the National Library of Medicine, more new and useful medical knowledge probably was attained than in all the ages of the past.

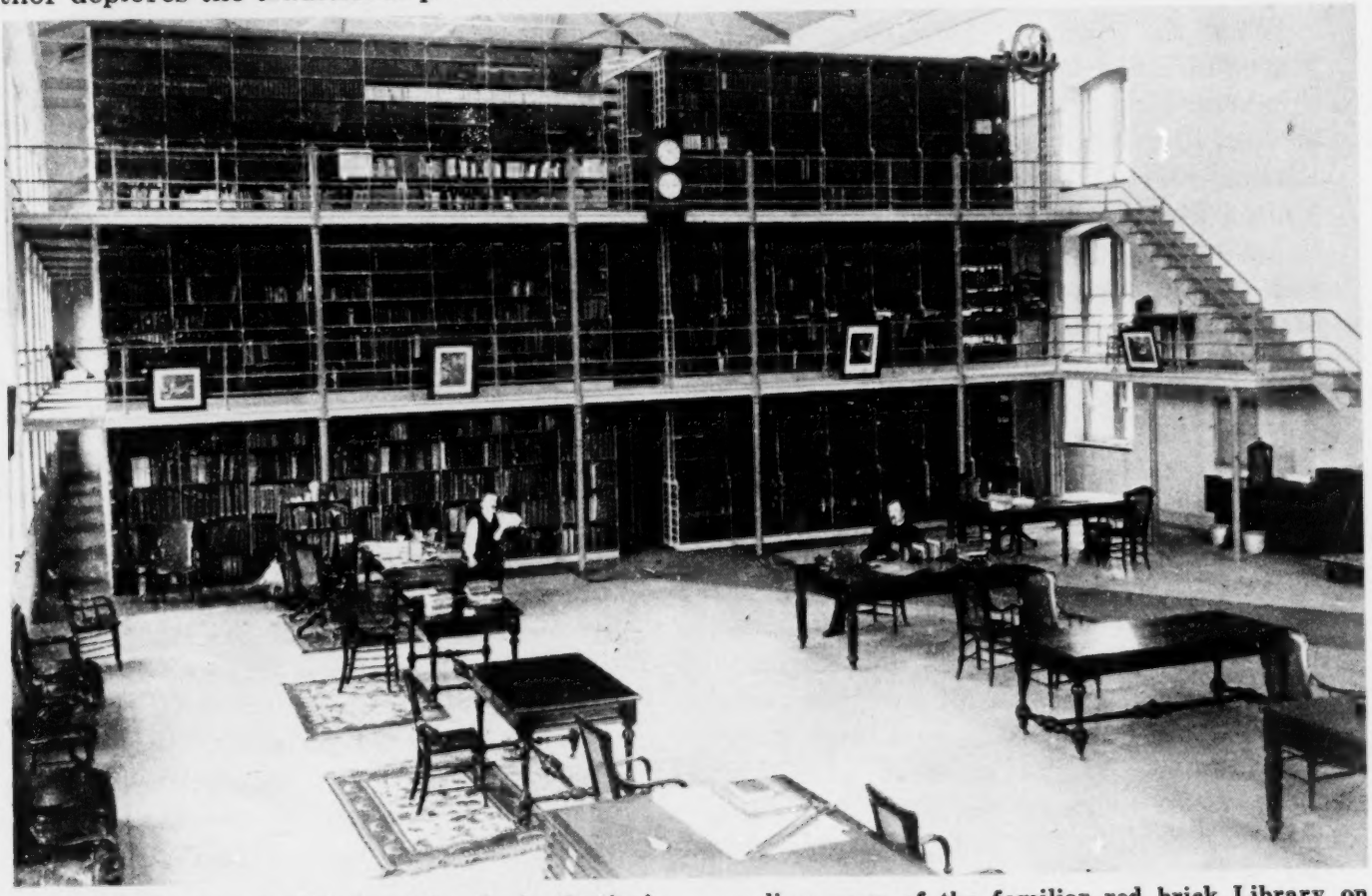
The colossal task of a large medical library in collecting, organizing, indexing, and disseminating the masses of medical literature that communicate new knowledge may be exceeded only by the ordeal it presents to the physician or medical student in selecting, judging, discriminating, and then learning what he needs to know. The 11 U.S. medical journals of 1836, and others in foreign countries, have multiplied unceasingly. They

now number more than 6,000 currently active titles.

This year the National Library of Medicine is adding to its international computerized Medlars system nearly a quarter of a million new citations to the world's medical literature gleaned from the 2,200 most useful and important current biomedical journals. Coupled with the need for ready access to specific and useful information, however, there is always the problem of how much can be remembered for practical application. There is a growing trend among medical educators to emphasize how to find, not recall, needed information. One has suggested "eliminating almost all memory efforts" in the belief that "the student's capacity to define problems and find and use knowledge effectively are the most important qualities to develop." Another physician put it this way: "The amount of information now both available and necessary for proper patient care has grown far beyond the ability of any person to carry in his head." The same author deplores the traditional practice of medical schools and specialty examining boards of conducting tests that reveal only what information has been retained. He suggests that use of the library resources be permitted during these written examinations to "shift our emphasis toward the skillful obtaining of information rather than on its retention."

Such seemingly unconventional procedures presuppose, of course, that the physician or student has learned how to use the library's resources, and is familiar with the catalogs, indexes, bibliographies, reference volumes and the staff assistance available to him. Also, it would be assumed that he knows something about maintaining his own information filing system. Experienced professional librarians readily provide this assistance and, in many medical centers, the instruction is augmented by physicians who offer guidance in the clinical discrimination and judgment involved in using the literature.

If, as has been said, the medical library is "the single most important factor" in pro-



In 1894 Dr. John S. Billings, right, the institution's first librarian, posed for this photograph in the main reading room of the familiar red brick Library on the Mall. The building was razed in 1970.

grams of continuing medical education it will truly come into its own as an information and learning center. This is further confirmed by the growing practice of locating new libraries in proximity to patients, and not in a remote area of the hospital or the medical campus. Such innovations lead more directly to "patient-related learning," and follow from the belief that when a need-to-know exists, the information sought is promptly used in practical application and retained longer. Some libraries, in an effort to be of maximum benefit, are open at all hours to accommodate physicians with sick patients.

Service is the hallmark of a medical library's utility. The extent and kinds of services available are dependent in part on the size and scope of the collection, but rapid access to needed information is the true gauge of usefulness. Are new types of services needed to improve and enhance library usefulness? Recently the National Library of Medicine supported a major study of 92 medical school libraries, and one of the conclusions reached was "that increases in the staffs and budgets of medical school libraries over the past two decades have gone largely to supporting a rapidly increasing volume of service, rather than any striking increase in the breadth of services." This seems to be another way of saying that the expense of handling the increasing amount of medical literature and providing for the needs of additional staff and faculty members, and more students, left no funds available for additional and innovative services. Fortunately, a solution may be at hand.

The traditional spirit of cooperation among libraries in sharing their resources with one another has now been recognized by statute as a logical and effective means of improving and expanding the services provided. For the first time in our history a program of Federal grants of assistance to medical and other health science libraries has been provided in the Medical Library Assistance Act, together with the framework of a system to support and legalize the dependence of smaller libraries upon larger facilities. As a result, improved communications

First meeting of the Board of Regents in the new National Library of Medicine in Bethesda on December 14, 1961, Dr. Worth B. Daniels, chairman.

by means of teletypewriter (TWX) and wide area telephone systems are increasing. Faster and more reliable copying machines have speeded interlibrary loans. Libraries are being established in small community hospitals where none existed before by procurement of a preassembled packaged unit of basic textbooks, journals, and reference volumes. More medical librarians are receiving advanced academic training in the knowledge and skills of this profession.

Since passage of the Act in 1965 and its extension in 1970, the National Library of Medicine has supported 600 projects of medical libraries throughout the country in 49 states in the amount of $46.7 million. This essential program is continuing.

The formalization of cooperative support among medical libraries has been attained by the designation of ten outstanding libraries, and the National Library of Medicine, each to serve a specific geographic area of the country under the Regional Medical Library Program. Within each region of several states, the smaller community hospital and medical society libraries rely on aid from the larger hospital and medical school facilities. They are backed up by the regional library which looks to the National Library of Medicine as the ultimate source of assistance or loan of material.

The gratis interlibrary loan and photocopy services provided by the regional libraries are supported by contracts with the National Library of Medicine. Each regional library also offers guidance and information services to its constituent libraries, and teaching workshops for their staff members. All main-

tain direct communication with the National Library of Medicine by means of telephone and TWX.

This cooperative linking of the nation's medical libraries into a developing biomedical communications network is made possible by the ready access to 1,400,000 citations that have been accumulated in the Medlars system since 1964. It has enabled the National Library of Medicine to sponsor a publications program of indexes, bibliographies, and literature searches, organized under precise subject headings, printed promptly in attractive formats and circulated widely throughout the world.

Senator Lister Hill turned the first spade of dirt at the ground-breaking ceremony of the National Library of Medicine on June 12, 1959. Looking on, from left, are Dr. Champ Lyons, chairman of the Board of Regents, Rep. Melvin R. Laird, and HEW Secretary Arthur S. Flemming.

Experimental projects currently conducted by the National Library of Medicine provide a glimpse of future developments that may lead to innovative programs. With the participation of several clinical centers, the Library is developing a satellite communications system to bring consultation services by voice and data transmission to physicians in remote areas of Alaska where telephone and radio reception is unreliable. Another project in New England involves the use of a two-way television network to assist in continuing education and support of patient care activities. A successful experimental service, known as AIM–TWX, soon will permit libraries anywhere in the country to tap a part of the Medlars bibliographic base for rapid literature searches through a teletypewriter terminal connected to telephone lines. With the cooperation of a number of medical schools and professional groups, innovative teaching-learning modules and new audiovisual aids are being created in support of pedagogical research. Present toxicological and pesticide information programs are being geared to share in the vast data bases of physical, chemical, and environmental hazards assembled in the computers of government agencies, professional societies and industry. A new automated, computer-assisted development, the Graphic Image Storage and Retrieval System, designed to speed photocopy reproduction for interlibrary loan service, will soon be in operation for test and evaluation.

This report reveals some highlights of the National Library of Medicine's services during this anniversary year. It recounts the accomplishments of its diversified professional staff of more than 450 library and biomedical scientists, physicians, medical educators, historians, literature analysts and translators, computer and electronic communications engineers, and the many persons working in their support. It describes the expanding progress both of established services and developing programs toward their goal of improving access to useful information and new medical knowledge for all who are dedicated to the prevention and treatment of disease and disability.

MARTIN M. CUMMINGS, M.D.
Director
National Library of Medicine

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ADMINISTRATION

The Board of Regents of the National Library of Medicine, the institution's governing and policy-making body, held its customary three meetings during the year under the chairmanship of Dr. Robert H. Ebert of Boston.

The Board has the statutory obligation "to advise, consult with, and make recommendations to the Secretary on important matters of policy in regard to the Library. . . ." Ten of its members are appointed by the President for four year terms. Serving as *ex officio* members are the surgeons general of the Army, Navy, Air Force and Public Health Service, the chief medical director of the Veterans Administration, the assistant director of biological and medical sciences of the National Science Foundation, and the Librarian of Congress. The Director of the Library is the Executive Secretary of the Board.

Following a review of the budgetary history of the Library since Fiscal Year 1968, the Board unanimously adopted a resolution expressing its concern "with the inadequacy of that support in the face of rapidly rising, uncontrollable costs, and more importantly in the light of the current administration's avowed purpose of making excellent health resources more readily available to the American public."

The Library's appropriations for the fiscal years included in the Board's study are:

1968	$21,674,000
1969	18,160,000
1970	19,573,000
1971	21,436,000

The resolution also stated that "the Board of Regents entreats the Secretary of Health, Education, and Welfare to concern himself with the impact of an array of Federal health programs on the activities of the National Library of Medicine. It is convinced that more effective delivery of health services and economies of scale in health professional education can be realized by greater familiarity with the Library's activities and capabilities. . . . Without additional support the resources of the National Library of

The Library's Board of Regents at a meeting in Bethesda in 1971 under the chairmanship of Dr. Robert H. Ebert, seated center. Appointed by the President, the Regents guide major policies.

Medicine are unable to cope with the increased demands for information services generated by programs for health care delivery, health education and health research."

In another action the Board approved both new policy guidelines for contracts negotiated with the Regional Medical Libraries and a review of existing policies related to the Library's grant program. The regents also studied an extensive report on the possible roles of the Lister Hill National Center for Biomedical Communications in medical educational technology, prepared by the Association of American Medical Colleges, and concurred in a progress report on the Alaska Health Sciences Library in Anchorage presented by Brig. Gen. Thomas J. Whelan, MC, USA, following a site visit.

Dr. William G. Anlyan, right, new chairman of the Board of Regents, accepts the gavel from Dr. Ebert.

The National Library of Medicine Scholars in Residence Program for visiting scholars was established by the Board "to encourage and to recognize scholarly research requiring use of the Library's collection." Candidates for appointment under the new program would pursue their chosen research projects on a full-time basis for a minimum of six months, a substantial portion of which would be spent in the Library.

The Board presented an inscribed plaque expressing its appreciation and esteem to Dr. Ruth M. Davis, the first director of the Lister Hill Center, for her leadership, management, and technical contributions. Dr. Davis is now director of the Center for Computer Sciences and Technology of the National Bureau of Standards.

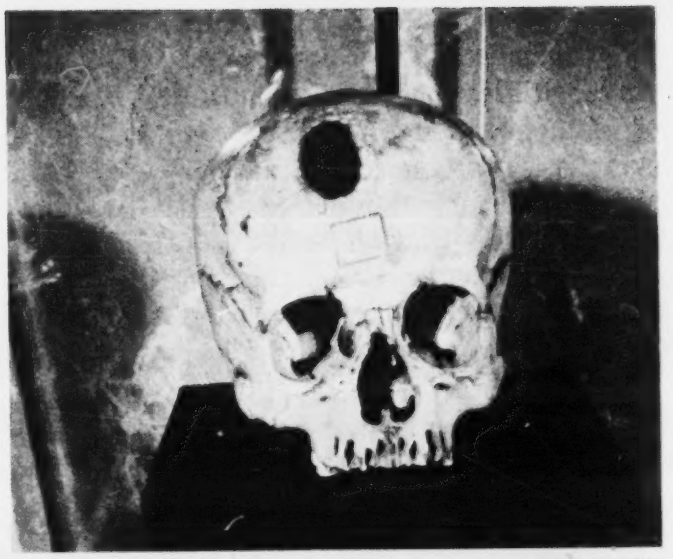
The second annual Regents' Award, given for scholarship and technical achievement, was won by Mr. Stanley Jablonski of the Library's staff, for his unique volume, *Illus-*

trated Dictionary of Eponymic Syndromes and Diseases and their Synonyms (Saunders, 1969).

To succeed Dr. Ebert, whose appointment as a regent is fulfilled on August 3, 1971, the Board elected as its next chairman, Dr. William G. Anlyan. Other retiring members of the Board are Mr. Bruno W. Augenstein and Dr. Frederick H. Wagman.

Tours and Exhibits

Tours of the Library were arranged for about 1,400 visitors. Replies were made to more than 3,800 inquiries received about the Library's various services and publications. Four timely exhibits, each presented separately for about four months during the year in the Library's main entrance foyer, at-



A trephined skull was among more than 100 publications and artifacts in a 1971 exhibit of "Medicine of the American Indians" in the entrance foyer of the Library.

An exhibit of books and journals for a basic hospital library is displayed for visitors to the National Library of Medicine. The size of the core library can be modified, as desired.

tracted considerable attention and comments. They included "The Darkening Day," a portrayal of environmental pollution; "The Art of Learning Medicine"; a collection of sketches, drawings, and paintings of U.S. Navy medical personnel and activities presented in observation of the 100th anniversary of the Medical Department of the Navy; and a colorful exhibit depicting "Medicine of the American Indians."

International Programs

Most of the Library's international programs, which maintain a high level of activity, are based on cooperative arrangements with a sharing of time, talent, and resources. The bilateral Medlars agreements now number eight with the inclusion this year of the National Science Library in Ottawa.

The Library's activities in both regional and national efforts to improve Latin American biomedical communications are demonstrated by its cooperation with the Pan American Health Organization in providing technical consultation and services to the PAHO Regional Library of Medicine in São Paulo, Brazil. This has increased the level and kinds of library services provided.

Forty-seven developing countries now receive services from the National Library of Medicine under a special agreement with the Department of State's Agency for International Development. These have markedly benefitted medical research, education, and practice. Under the fee-for-service policy initiated July 1, 1971, all non-AID countries are now subject to a fee for photocopy and audiovisual loan services. This has resulted in about a 67 percent reduction in services to these countries.

LIBRARY OPERATIONS

Library Operations programs serve to select, acquire, catalog, and preserve biomedical publications; index and provide access to the material through human and machine-produced bibliographies; furnish reference and loan service; prepare indexes, catalogs, and other publications for the use of medical libraries and health practitioners; and assist in the management of the Biomedical Communications Network through Regional Medical Libraries and Medlars Centers.

The Library Operations staff processes and analyzes publications ranging from the earliest historical documents to the latest journals. Services are provided requiring use of traditional library operating methods as well as computer, microfilm, and data processing facilities. Organizationally, Library Operations consists of four principal elements: the Bibliographic Services Division, the Technical Services Division, the Reference Services Division, and the History of Medicine Division.

The Library began studying requirements for implementing a network management system for data collection and analysis during the coming year. Such a system would standardize record-keeping and reporting of the Regional Medical Libraries and permit batch analysis of machine-readable records.

Training activities within the network continued. Instruction units in the use of *Index Medicus*, consisting of taped presentations coordinated with 35 mm color slides, were developed for distribution to the network. These were prepared for use in seminars and workshops, and for individual training of hospital librarians who lack access to other training programs.

Regional Medical Library Program

In fiscal 1971 the Special Assistant to the Director for Medical Program Development and Evaluation was appointed to coordinate the Regional Medical Libraries' activities in the Extramural Programs with those of Library Operations. All Regional Medical Libraries were operational by September 1970, and the Regional Medical Library Network

Study carrels overlook the stairway in the Francis A. Countway Library of Medicine in Boston that serves as the New England Regional Library. The structure was completed in 1965.

processed in excess of half a million requests for interlibrary loans during the year.

The principal change in Regional Medical Library operations was an increased orientation toward delivery of services supported by contract. In the four years during which the program has developed, funding for the supply of direct services such as document delivery, as well as support for training, consultation, and other ancillary activities, has been in the form of grants provided through the Extramural Program. Negotiations led to the signing of contracts with four regional libraries and the completion of negotiations with three others prior to the close of the fiscal year. Contracts with the remaining three will be negotiated during the coming year. Other non-service oriented activities would continue to be funded by grants through applications to Extramural Programs.

The National Library of Medicine and Regional Medical Libraries' staffs provided 120 user-training programs to about 3,000 health practitioners and students during the year. The programs concentrated on Medlars and on the more recent on-line bibliographic search capability provided by AIM–TWX, currently in use in over fifty institutions.

The Director appointed a Regional Medical Library Review Committee, composed of three members of the Biomedical Library Review Committee, Dr. Kelly West, Mrs. Reba Benschoter, and Dr. David Kronick. They will undertake an in-depth review of the current program.

Bibliographic Services Division

The Bibliographic Services Division indexes the periodical literature of medicine; prepares *Index Medicus* and other published indexes; formulates computer searches in response to individual requests for bibliographic assistance; and trains personnel from Medlars Centers in the techniques used in indexing the literature and searching Medlars files. It maintains technical liaison with domestic and overseas Medlars centers and coordinates their operations.

Indexing. During Fiscal Year 1971, about 225,000 articles were indexed for Medlars, exceeding the record production of the previous fiscal year by seven percent. More than two-thirds of the indexing was performed under contracts and agreements with cooperative agencies.

The previous indexing backlog was further reduced, by nearly 40 percent, to less than a two-month indexing load. This approaches the minimum back-load for optimum operating efficiency.

Searching. Approximately 18,000 Medlars demand searches were conducted for domestic users, an increase of more than 26 percent over Fiscal Year 1970. Limitations on processing capacity, however, required that restrictions be put on the number of search requests accepted after May 1971. When possible, alternate methods of bibliographic assistance were provided or suggested in place of Medlars search service. High processing

Table 1. Summary of Bibliographic Services

	FY 1969	FY 1970	FY 1971
Journals Indexed in *Index Medicus*	2,260	2,251	2,199
Articles Indexed			
NLM	99,447	90,859	65,885
Other U.S.	76,249	75,528	82,224
Foreign	34,906	43,613	76,510
Total	210,602	210,000	224,619
Medlars Searches Performed			
NLM	3,182	3,550	3,889
U.S. Centers	8,231	10,737	14,180
Foreign	4,062	6,453	5,648
Total	15,475	20,740	23,717
Recurring Bibliographies	16	18	23
Literature Searches Distributed	23,005	23,351	36,570

costs led to the curtailment of Medlars computer processing activity at some centers during the year.

Publications. *Abridged Index Medicus,* a monthly publication of citations of articles in the most important 100 clinical journals printed in English, continued to receive favorable comment. The first annual cumulation, *Cumulated Abridged Index Medicus* for 1970, was published early in 1971.

To meet the needs of those with an interest in the effects of the environment on health, the Library in January 1971 began publishing a new monthly recurring bibliography, *Selected References on Environmental Quality as It Relates to Health.* These four additional new bibliographies produced by the Library bring to 23 the number of recurrent bibliographies available:

- *Index of Tissue Culture 1966–1969,* published by the Tissue Culture Association.
- *Annual Bibliography of Orthopaedic Surgery,* published by the Subcommittee on Orthopaedic Information Services of the National Research Council's Committee on the Skeletal System.
- *Bibliography on Strabismus,* published by the International Strabismological Association.
- *Bibliography of Selected Reviews on Cardiovascular Diseases,* published monthly in the *American Journal of Cardiology* beginning September 1971.

Furthering the ongoing program of distributing bibliographies on subjects of wide interest, 32 new Literature Searches were added to the list of available titles.

About 300 new main headings were prepared for introduction into the 1972 edition of *Medical Subject Headings* (MeSH), the controlled vocabulary which serves as the subject heading authority list for indexing and cataloging.

Medlars Tapes. In April 1971, the Library made available on subscription the magnetic computer tapes containing data from Medlars. Subscribers receive the current monthly tape file of citations indexed for Medlars, and dictionary files to facilitate use of the citation file. Subscribers may also obtain up to three years of back files by direct purchase, but programming and system documentation are not available. The National Technical Information Service is handling the sale and distribution of the data tapes for the Library.

Table 2. Growth of Collections in Fiscal Year 1971

	Volumes Added	Total Volumes in Collections
Book Material		
Bound monographs		
Prior to 1800	554	38,072
1801 to 1913	255	89,313
1914 to present	8,772	236,990
Bound serials	12,292	377,776
Unbound issues (volumes)	1,197	22,161
Theses	8,962	327,810
Pamphlets	237	171,759
Total book material	32,269	1,263,881
Non-Book Material		
Microfilms (archival)	721	11,832
Microfiche	845	3,945
Pictures	730	67,863
Total non-book material	2,296	83,640
Grand Total	34,565	1,347,521

Table 3. Summary of Acquisition Statistics

	FY 1969	FY 1970	FY 1971
Serial Record *			
New titles added	1,847	2,114	1,534
Discontinued titles	1,604 **	598	337
Current titles received	19,448	20,964	22,161
Publications Processed			
Serial pieces	96,920	94,175	97,816
Other	27,353	27,767	25,499
Total	124,273	121,942	123,315
Obligations for Publications	$286,398	$355,000	$370,438
Included for rare books	$ 41,353	$ 60,212	$ 57,945

* Figures for serial titles have been corrected for titles that have been deleted or ceased publication.
** Includes 1,000 titles (congresses and college catalogs) removed from serial records.

Technical Services Division

The Technical Services Division selects and acquires the world's biomedical literature and catalogs books and monographs. It disseminates cataloging information through the *NLM Current Catalog,* and provides camera-ready copy to the Medical Library Association for issuance of semiweekly proof sheets.

Negotiations with Bro-Dart, Inc., of Williamsport, Pa., were completed for commercial production and distribution of NLM catalog card sets to medical libraries. Provision of this service came in response to requests from medical librarians who have sought for some time to secure the Library's cataloging data in card format. Negotiations began late in 1970 and were concluded the following spring. The service began in June 1971. Card sets may be purchased on subscription or selectively by using NLM citation numbers.

In August 1970, a Serial Records and Binding Section was established within the division. The new section absorbed the serial record activities and associated personnel from the Selection/Acquisition Section of the Technical Services Division and binding operations with its associated personnel from the Reference Services Division.

Preparations were completed for the publication in November 1971 of a sexennial cumulation of the *NLM Current Catalog.* The cumulation will include all of the Library's cataloging for the years 1965–1970, comprising its complete store of machine-readable cataloging data.

For security purposes, the Library arranged for the recording on 16 mm microfilm of its main card catalogs.

An in-house scope and coverage committee was reestablished to review and revise the existing scope and coverage working paper used as a guideline for selection and acquisi-

Table 4. Summary of Cataloging Activities

	FY 1969	FY 1970	FY 1971
Completed Cataloging			
New titles	14,273	16,344	15,862*
Recataloged titles	1,253	1,423	933
Total	15,526	17,767	16,795
Volumes Reclassified and/or Transferred	1,582	2,055	683
Catalog Cards Filed	119,904	113,080	114,786
Volumes Shelflisted	10,380	10,441	10,996

* Includes 1,133 cataloged by Suny and Countway and 449 cataloged by Keio University.

Table 5. Binding Statistics

	FY 1969	FY 1970	FY 1971
Number of Volumes			
Sent to binder	16,650	15,361	16,807
Returned from binder and processed	15,606	17,157*	16,397
New volumes	14,805	15,999*	15,111
Rebinds	801	1,158	1,286
Bound at NLM	6,330	5,551	5,623
Repaired at NLM	4,787	4,683	3,150

* Correction of figures in 1970 report.

tion. Procedural changes were made to provide closer control over the nature of materials accepted for the Library's collection.

The Library has continued to supply serial holdings to the data base of the *Union Catalog of Medical Periodicals,* produced by the Medical Library Center of New York. Data for 18,000 titles of the Library's holdings have now been input.

References Services Division

The Reference Services Division provides reference, bibliographic, and reader services to users at the Library and, in conjunction with the Regional Medical Library Network, supplies material from the Library's collections to the biomedical community by means of an extensive interlibrary loan program. It also maintains and preserves, through the microrecording of deteriorating publications, the collection of library materials published from 1871 to date.

Services. The Reference Services Division received over 20,000 reference inquiries during the fiscal year. More than 22,000 health science professionals and students used the Reading Room and requested over 92,000 items from the collection.

The new Florence Bioinformation Center of the University of Texas Southwestern Medical School at Dallas, shown in an architect's rendering, will be completed in the fall of 1973 to provide expanded facilities for the South Central Region. It is part of a $19 million building program.

The development of a basic multimedia resource area in the Reading Room was completed during the fiscal year. Three study carrels were remodeled to provide soundproof, comfortable viewing and listening rooms. In an adjacent area are arranged the Library's current audiovisual periodicals collection, cassette playing devices, and a large color television receiver equipped with earphones. A card catalog contains about 1,000 titles in the multimedia collection that are listed by subject, name, and medium. Other equipment includes microfiche and microfilm readers, 8 mm loop cartridge film projectors, a reel-to-reel tape recorder, cassette recorder, slide projector and screen, and a record player. Current materials of particular interest are available for ready use. One carrel contains special exhibits, and another is a projection room in which eight viewers may be seated. Equipment includes a 16 mm motion picture projector, slide projector, and a reel-to-reel stereophonic tape recorder. The multimedia resource area was planned as a showcase of materials and equipment available, and as a prototype for other medical libraries.

A portable computer terminal located in the Reading Room provides the Library's users with direct on-line bibliographic access to the AIM–TWX data base for four hours each day. Members of the Reference Section

The innovative AIM-TWX service provides rapid, responsive searching of the medical literature.

staff are trained in the demonstration and use of the system and the Library's patrons have been encouraged to become their own search formulators. Public reaction to the system has been enthusiastic.

A second pilot issue of the *Bibliography of Medical Bibliographies* was prepared by the Health Science Bibliographic Clearinghouse, a unit of the Reference Section. This publication reports NLM Literature Searches, bib-

Table 6. Summary of Reference Services

	FY 1969	FY 1970	FY 1971
Requests by Telephone	11,698	10,715	10,027
Government	5,500	5,281	4,653
Non-government	6,198	5,434	5,374
Requests by Mail	1,322	1,218	1,391
Government	161	145	133
Non-government	1,161	1,073	1,258
Readers Assisted	11,185	9,769	8,868
Government	3,795	3,487	3,219
Non-government	7,390	6,282	5,649
Total	24,205	21,702	20,286
Government	9,456	8,913	8,005
Non-government	14,749	12,789	12,281
Readers Counted	27,303	25,786	22,382

liographies prepared by specialized information centers, bibliographies appearing in books and journals or as separate publications, and unpublished bibliographies from medical libraries. It includes a citation section, containing descriptive and source information, and a keyword-in-context (KWIC) index which is composed of titles and a select number of subject headings.

Interlibrary Loan. The division received more than 126,000 interlibrary loan requests during the year. More than 93 percent of those requests filled were in the form of photocopies of journal articles.

Photoduplication. In addition to support for the interlibrary loan and preservation programs, the Photoduplication Section undertook the filming of material for use in the Graphic Image System, processed over 163,000 photocomposed pages for *Index Medicus* and other publications, and produced almost 1,900 photographs and slides. A total of almost 2,700,000 pages were microfilmed for all programs during the year.

Table 7. Summary of Circulation Activities

	FY 1969	FY 1970	FY 1971
Number of Requests			
Received	234,666	219,229	218,982
Filled	199,461	179,390	186,144
For readers	82,412	78,779	83,585
By interlibrary loan	117,049	100,611	102,559
Photocopy	110,573	93,746	95,559
Original	6,476	6,865	7,000
Unfilled	35,205	39,829	32,838
Rejected	7,510	14,244	9,273
Unavailable	27,695	25,595	23,565

A multimedia resource area is a new addition to the main reading room of the National Library of Medicine. The collection contains about 1,000 titles for use in soundproof study carrels.

The new Vera Parshall Shiffman Medical Library of Wayne State University School of Medicine is located in a 236-acre site of the developing Detroit Medical Center. The $2.3 million facility serves as the East Central Regional Library for Kentucky, Michigan, and Ohio.

The Biomedical Library of the Center for the Health Sciences of the University of California at Los Angeles is the hub of the Pacific Southwest Region. This is a view of the main reading room. The library also houses the subregional Medical Communications Information Service.

Table 8. History of Medicine Activities

	FY 1969	FY 1970	FY 1971
Acquisitions			
Books	456	1,538	1,284
Modern manuscripts	23,250	159,627	141,142
Oral history hours	83	66	10
Prints and photographs	2,286	634	753
Processing			
Titles cataloged	1,384	3,132	1,618
Modern manuscripts cataloged	39,831	39,070	41,441
Pictures indexed	486	430	205
Articles indexed	4,620	5,327	3,114
Pages microfilmed	139,003	160,704	173,733
Public Services			
Reference questions answered	1,652	1,461	1,755
ILL and pay orders filled	2,234	1,985	1,880
Reader requests filled	4,742	3,876	4,717
Pictures supplied	1,409	1,094	2,010

History of Medicine Division

The History of Medicine Division acquires, organizes, and services the Library's original source materials for study and research in the history of medicine and related sciences. It prepares catalogs, bibliographies, and work of independent historical scholarship. The Division has custody of manuscripts, fine prints, and all publications in the Library's possession that were issued prior to 1871.

During Fiscal Year 1971, this Division provided about 4,700 books, manuscript boxes, and microfilm reels to readers in the Library. It filled nearly 1,900 requests for photocopies and interlibrary loans, and supplied more than 2,000 photographs and slides in response to requests for pictorial material. Almost 1,300 volumes were added to the Library's historical collections, and more than 140,000 manuscript items, including papers of Henry N. Harkins, Yandell Henderson, Chauncey D. Leake, William S. Middleton, and Milton Senn. Oral history memoirs were completed for William S. Middleton and Donald Dexter Van Slyke. To improve access to the collection, and in anticipation of future publication, the Division cataloged more than 1,500 monographs and serial titles and indexed over 3,000 articles.

COMPUTER AND ENGINEERING SERVICES

The Office of Computer and Engineering Services is responsible for providing computer and related automated data processing support to all program areas of the Library. This support includes the development and implementation of new systems, the maintenance of existing systems, the Medlars input preparation, and the operations of the Library's computers and photocomposing equipment. As a part of this effort, the staff accomplishes systems analysis and design, and computer programming.

Medlars I Activities

The Medlars I production activity continued to operate efficiently. Supported by the Honeywell 800/200 computers, the system has been extended beyond its planned life because of the delays and problems associated with the development of Medlars II. In spite of this, the system has been able to handle ever-increasing work loads. During Fiscal Year 1971, there were 226,945 citations added to the indexed citation file and 21,407 entries added to the catalog file. A total of 75,265 pages of photocomposed publications were produced and 10,063 retrospective demand searches were processed. Computer time was obtained from the Department of Defense to enable the Library to process this large load of demand searches. In addition to producing the wide range of Library publications, this Office also completed the processing of a sexennial cumulation of the *NLM Current Catalog*.

In order to permit the Library to respond to the increasing requests for demand bibliographic search service without continued computer assistance from the Department of Defense, the search programs of the Karolinska Institut in Stockholm that operate on an IBM 360/50 computer are being acquired. This will give the Library the capability of processing retrospective searches on its own 360/50 computer as well as on the Honeywell equipment.

Medlars II Development

Initiated in June 1968, the Medlars II project had as its purposes the development of an improved computer-aided system for the production of the Library's various bibliographic publications and the support of retrospective literature searching through the application of the latest technical developments in the computer field. The new system was to provide access to the computerized bibliographic files through remote terminals permitting interrogation of the files with direct and immediate response. In addition, it was to support an augmented vocabulary and to extend automation to selected library functions such as acquisitions.

The development of Medlars II, however, was plagued by a series of problems and delays. Concurrent with this effort's being conducted on contract, the Library began the development of an on-line, interactive bibliographic search and retrieval capability (AIM-TWX), in an experimental effort with another contractor, using the citations from *Abridged Index Medicus* as the data base.

These two projects were reviewed in detail by responsible members of the Library's staff, assisted by computer consultants, in the latter part of the fiscal year. On the basis of this study, the Director of the Library concluded that it would not be in the best interests of the Government to continue the Medlars II contract as negotiated in June 1969. The on-line experimental effort, on the contrary, was judged to be very successful. Therefore, a conversion will be accomplished to place Medlars on the third-generation hardware, add certain features including an expanded vocabulary, and design the new system around the file structure, logic and design of the experimental on-line, interactive system. In June 1971, a new contract was let for the performance of these tasks.

This new GPO Linotron 1010 photocomposer replaces the Photon 901 used in production of many of the Library's bibliographies and other publications.

Two major system changes were begun when it was apparent that there would be continuing delays in the development of Medlars II. Work was begun in late Fiscal Year 1971 to prepare programs to permit the use of the Keymatic encoders (a keyboard-to-magnetic tape device) for the preparation of input to the computer, rather than the punched paper tape process used in the past. In addition, programming is being accomplished to support the use of the Government Printing Office's new photocomposing device, Linotron 1010, in place of the Photon 901 currently in use at the Library. These changes were originally to be performed as a part of the Medlars II project. The programming for the input conversion has been completed and production will begin in early Fiscal Year 1972. The photocomposing transition will also be ready early in the year.

SPECIALIZED INFORMATION SERVICES

The Library's Specialized Information Services was established to meet national needs for information in toxicology and related fields. Its staff receives guidance concerning scope and operational priorities from the Toxicology Information Program Committee in the Division of Medical Sciences of the National Academy of Sciences-National Research Council.

The Toxicology Information Program has produced computer-based files of toxicology information and data. Extensive collaboration with the Food and Drug Administration and the new Environmental Protection Agency has resulted in the development and use of several automated data banks and systems, including:

- A central data management system for the Environmental Protection Agency's Division of Community Studies, directed to epidemiological studies of persons occupationally exposed to pesticides.
- An on-line whole-text search system for the abstracts from the *Health Aspects of Pesticides Abstract Bulletin* (1966 to present) and the *Report of the Secretary's Commission on Pesticides and Their Relationship to Environmental Health* (*Mrak Report*).
- Initiation of a data bank of toxicological data extracted from 400 approved pesticide petitions from the files of the Environmental Protection Agency and the Food and Drug Administration.

New Projects

Among projects under development is a drug interaction bibliography (1967–70), with selected excerpts. Articles for this compilation will be excerpted to highlight the interacting substances and the observed biological effects. Publication is planned for the end of 1971.

Another project under contract is the preparation of a toxicology vocabulary, structured in thesaurus format and compatible with *Medical Subject Headings*, the Medlars vocabulary. It will be completed in 1972.

Through an agreement with the Atomic Energy Commission, a Toxicology Information Query Response Center has been established at the Oak Ridge National Laboratory. It is intended to be the service arm of the Toxicology Information Program, performing in-depth literature searches, evaluating and analyzing information, and preparing

state-of-the-art reports. The Center will be able to draw on a wide spectrum of scientific disciplines represented at the Oak Ridge National Laboratory as well as the information resources being created by the Toxicology Information Program in other activities. Using the extensive library and computer facilities at Oak Ridge, the Center will also have access to most of the commercially available literature tape services. It is expected that requests for services will come to the new Center either directly through the Toxicology Information Program or through the Library's Reference Services Division.

The new on-line, computer-based Roster of Authorities in Specialized Subtopics of Toxicology and Related Fields is operational.

Data Files

Activities associated with the development of specialized Toxicological Information Program computer systems have been phased out in order to use the resources for the collection of data for commercially available systems. A contract has been negotiated to adopt a system capable of storing and retrieving large amounts of data via on-line, remote terminals. The data bases to be incorporated into this system include free-text information as well as highly structured data. Extensive use of these data files is expected to lead to an increase in present collaborative efforts with other Federal agencies and the initiation of agreements with industry to enhance the quality, quantity, and diversity of the toxicological data files.

To increase access to the Medlars data base through chemical and drug names, a link between Medlars and certain data bases of Chemical Abstracts Service is being established. This system should enable the Library to connect a substance name, found by an indexer in an article, to a Chemical Abstracts Service registry number, an accepted name for that substance, and the Medlars citation number. Through a link into a file of biomedical compounds, called the Common Data Base, the Library will also have the capability of performing chemical structure searches, using existing Chemical Abstracts Service computer programs.

Some of the other activities formerly conducted under the Drug Literature Program were transferred to other Library areas.

The John Crerar Library in Chicago, a privately supported public library devoted to science, technology, and medicine, serves as the Midwest Regional Library. One fifth of its million-volume collection is devoted to health sciences. The library also operates the National Translations Center.

NATIONAL MEDICAL AUDIOVISUAL CENTER

The National Medical Audiovisual Center in Atlanta, Georgia, strengthens the information and education services of the National Library of Medicine by planning and administering a national biomedical audiovisual program.

The Center's staff works with health science practitioners and educators, national organizations, and federal health programs. It encourages the development, utilization, and sharing of audiovisual educational materials and systems through consultative and educational support programs; provides audiovisual reference and search services; and distributes professionally oriented audiovisuals either produced by the Center or acquired from other sources.

In May 1971, the National Library of Medicine signed an agreement with the Bureau of Health Manpower Education of the National Institutes of Health to establish an Office of Audiovisual Educational Development in the Center. In Fiscal Year 1972, up to 50 percent of the Center's productive capabilities will be devoted to the Bureau's programs and projects which coincide with, or complement, the Center's programs.

Media Development

In cooperation with national professional medical organizations, health science professionals, and medical educational institutions, the Center is developing and producing pilot instructional units for medicine, dentistry, nursing, and allied health professionals. These units are designed according to objectives stated by the cooperating group, many in modules to permit economical updating and interchangeable use within several disciplines.

Twenty-eight schools, comprising the Association of Deans of Southern Medical Schools, have agreed to develop teaching packages for sharing among all the schools. Each participant has named a program coor-

One of 15 seminar-workshops held during the year at the Library's National Medical Audiovisual Center in Atlanta. This training session was devoted to cataloging and management of medical audiovisual information and media. The Center lends about 85,000 audiovisuals each year to professional groups.

dinator, and a full-time program director has been appointed by the Association. The Center will refine and finish each unit to production standards and provide specialized segments, such as animation, which individual schools may not be equipped to handle.

In cooperation with the Division of Dental Health of the Bureau of Health Manpower Education, the Center produced a slide/sound package on the team approach to dentistry. Completed in May, it was used by Dental Health Manpower Training personnel to indoctrinate dental faculty members.

Media Evaluation

As part of its mission to serve medicine and allied health education, the Center is carrying out a two-pronged evaluation program. In May 1970, a review was initiated of its existing motion picture collection for accuracy and currency. More than 100 titles were eliminated and the present collection of about 950 motion pictures is now up-to-date and educationally oriented. A cooperative peer review system is utilized to evaluate both present film holdings and future acquisitions. Cooperating national organizations include the Association of Medical School Pediatric Department Chairmen, American Association for Cancer Education, American College of Radiology, Veterans Administration Hospitals' surgical staffs, American College of Cardiology, American Academy of Dermatology and American Physiological Society.

Acquisition and Distribution

This was the first full year of operation for a new, automated audiovisual distribution system. The entire operation of receiving requests for, booking, and scheduling of audiovisuals is now computer-supported. About 120,000 requests were received and processed during the year. About 85,000 audiovisuals were loaned to professional users.

Reference Activities

The Center has completed the second year of operating the International Index of Medical Film Data, a major computerized data base. For greater relevance to the current needs of health science professionals, citations were reviewed and reduced from about 25,000 to 4,000. Proposed additions to the data base will be screened in advance by peer groups. The reference staff provided major input to audiovisual resource publications for a number of national organizations.

During the year, plans were made to add audiovisual citation data to Medlars so the Center's distribution collection acquisitions would be included in the *NLM Current Catalog*.

Training

The Center presented a series of ten seminar workshops on specialized audiovisual production techniques, management of audiovisual information, and facilities planning for medical and allied health sciences person-

nel. Three conferences were cosponsored with national medical organizations. Two staff members gave nine presentations to the Royal College of Physicians and Surgeons in Glasgow.

Consultations

An overview of the Center's activities and physical facilities was given to 217 visitors from medical schools, medical centers, and health-related organizations in the United States and from 20 foreign countries. A total of 259 consultations, surveys, site visits, design projects, and educational programs were provided for 139 schools of the health sciences, hospitals, medical libraries, and other related agencies. This figure includes 57 medical schools, 11 dental schools, 14 nursing schools, four schools of veterinary medicine, one school of pharmacy, two schools of optometry, 24 hospitals, 9 medical libraries, and 17 schools of allied health and health-affiliated agencies. Complete survey reports were prepared for the Columbia-Presbyterian Medical Center, University of Iowa College of Medicine, Stanford University Medical Center, and Marquette School of Medicine.

Videotape Program

Since the announcement of its free videotape duplicating program in September 1970, the Center has duplicated about 800 tapes for 115 schools and hospitals. The inventory of master tapes is being expanded and updated. Additional equipment now on order will provide for increased volume and higher quality color duplicating.

Dedicated in May 1971, the University of Nebraska Medical Center Library in Omaha occupies 71,000 square feet on three levels, plus an open terrace, built atop the Basic Science Building of the College of Medicine. The Midcontinental Regional Medical Library Program is directed from this new facility.

The Health Sciences Library of the University of Washington in Seattle will occupy the second and third floors of the new Health Sciences Center, shown in an architect's model, when the structure is completed in October 1972. The library directs services for the vast Pacific Northwest Region.

The headquarters of the Southeastern Medical Library Program is in the A. W. Calhoun Medical Library of the Emory University School of Medicine in Atlanta. Shown is a partial view of the current periodical area and entrance to book stacks. The region comprises six states and Puerto Rico.

LISTER HILL NATIONAL CENTER FOR BIOMEDICAL COMMUNICATIONS

The Lister Hill National Center for Biomedical Communications is responsible within the National Library of Medicine for applying computer and other communications technologies to the improvement of health care, medical education, and biomedical research.

Fiscal Year 1971 was a year of transition for the Center. The previous year was one of pilot projects, limited experiments, and feasibility demonstrations. Now three of these projects—the satellite communications effort, AIM-TWX, and the New England Interactive Television network—are expanding towards full-fledged experimental systems.

Communications Network

Since June of 1970 the Center, in cooperation with Library Operations staff, has been providing an experimental, on-line, remote access bibliographic service called AIM-TWX, based on the citations from 100 English-language clinical journals in *Abridged Index Medicus*. The citations are sent to the Systems Development Corporation in Santa Monica, California, where they are stored on an IBM 360/67 computer. The data base is now made up of more than 160,000 citations from 122 journals. Users, who range from trained Medlars searchers to practicing physicians, may query the system from remote terminals which can be connected by TWX or ordinary telephone lines.

The system is available for use four hours a day. There are now about 50 institutions regularly using this service, with more than 600 hours of connect time a month. As many as 18 searchers can use it simultaneously, with an average of over nine searches being conducted at any given time.

Plans are under way to increase the number of journals covered and the number of users served, and to decrease the cost of communicating with the central computer. Widespread availability of such an improved service could reduce the volume and expense of the present batch searching system.

The Alaska Native Medical Center in Anchorage is the focal point for relaying medical care consultation by satellite to remote villages throughout the state. Professional care is provided to village residents by the area field services units of the Alaska Native Health Service.

Satellite Experiments

The success of preliminary experiments in using the National Aeronautics and Space Administration's Applications Technology Satellite (ATS–1) for voice and data communications between the Center, the University of Wisconsin, Stanford University, and the University of Alaska in Fairbanks has stimulated plans for expansion into an experimental project for improved health care services in Alaska. A two-level network will be developed between the universities and from the Alaskan Native Medical Center to the field service units of the Alaskan Native Medical service, and then from these service units to selected villages. This network will permit direct consultation between physicians and also between physicians and health aides in native villages. Twenty-six sites have been selected for the Alaskan portion of the experiment.

The development of new capabilities beyond voice will be tested first by the above universities, the University of Washington, and the Lister Hill Center in the continental U.S. Such tests will investigate the usefulness of the transmission of physiologic and computer data, facsimile, and slowscan television.

Television Network

In June 1970, the Center started funding an experimental two-way, closed-circuit television link, using leased lines, between the Dartmouth Medical School and the Mary Hitchcock Memorial Hospital in Hanover, New Hampshire, and Claremont General Hospital about 30 miles distant.

The purpose of the contract was to use video technology to extend the consultative facilities of a university medical center to physicians and other health care professionals who, because of terrain and climate, are

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somewhat isolated from major medical resources. The link has been heavily used for such services as psychiatric and mental health consultations, cancer clinics, coronary care unit nurses' conferences, social service activities, and medical and surgical grand rounds. An auxiliary data link is available three hours a day for transmitting electrocardiograms.

A contract has been signed with Dartmouth College and the University of Vermont to extend the network. The major part of this effort is devoted to building a microwave network with mountain-top relay points connecting Dartmouth and the University of Vermont with Claremont Hospital and the Central Vermont Hospital.

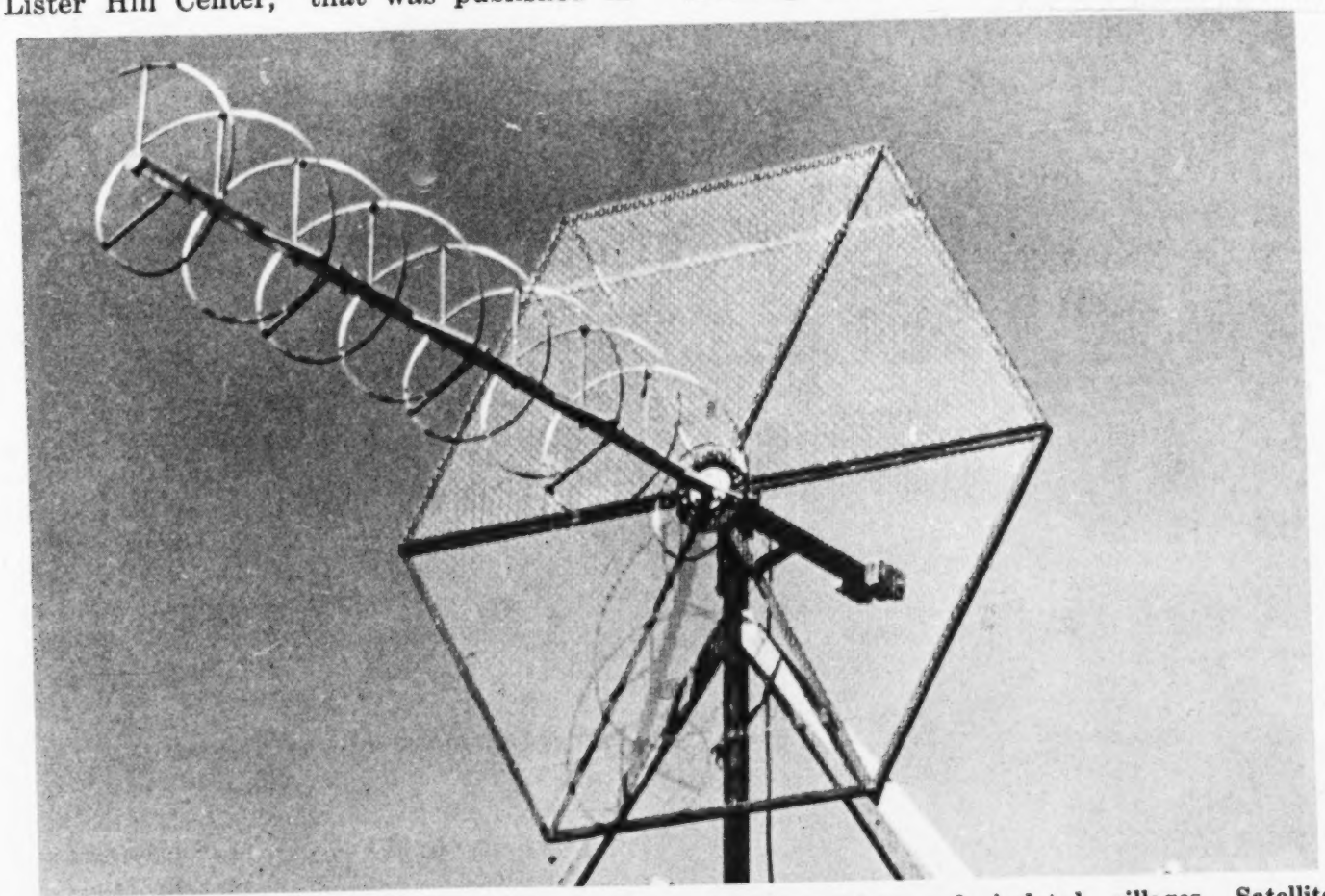
Educational Technology

The Association of American Medical Colleges, under contract with the Lister Hill Center, prepared a major report, "Educational Technology for Medicine; Roles of the Lister Hill Center," that was published in the *Journal of Medical Education* for July 1971. This report endorses the implementation of a biomedical communications network. It also recommends that the Center play a major role in such areas as developing evaluative criteria for nonprint media and assisting the medical community in the application of computers as aids to instruction and diagnosis; and that the Center increase its own internal research and development capabilities.

Content Materials

A contract with the Universities Associated for Research and Education in Pathology provides for the development of teaching units to support learning in specific areas of undergraduate pathology. Each unit consists of a monograph, a set of slides, and a list of additional audiovisuals that would be useful.

A similar contract with the Association of Professors of Gynecology and Obstetrics supports the identification and reproduction of teaching units for undergraduate education



This is the type of helical antenna used to transmit communications via satellite between Alaska health centers and isolated villages. Satellite terminals are being installed at 26 sites in the State.

in obstetrics and gynecology. More than 100 medical schools have requested the teaching packages and have agreed to participate in their evaluation.

On-Line Indexing

The M.I.T. Lincoln Laboratory's Listar system, a general-purpose storage and retrieval system, was used for a series of experiments in on-line indexing. A remote display station at the Library was connected by leased line to an IBM 360/67 computer at the Lincoln Laboratory. The staff time for indexing averaged five minutes for bibliographic input, 14 minutes for subject indexing, and 21 minutes for revising, or a total of 40 minutes per article. This interactive indexing produced a machine-readable form of the principal data in Medlars citations which could be transformed into the main citations file without further human handling.

The Library of the College of Physicians of Philadelphia serves as the Mid-Eastern Regional Medical Library. This is a view of the card catalog and main reading room. The library was founded in 1788.

EXTRAMURAL PROGRAMS

The Office of Extramural Programs provides grants designed to meet the needs for expanded health information services through:

- Improvement of libraries and library networks to facilitate the distribution of information to professional and allied health personnel.
- Training programs to develop new types of library and information specialists.
- Research for the development of modern communication tools concerned with the acquisition and use of health information.
- Support of publications of important information which is not feasible commercially.

In the seven programs authorized by the Medical Library Assistance Extension Act of 1970, the Extramural Programs funded 102 new grants in the amount of $1,270,679 and 422 continuing grants and eight contracts in the amount of $4,721,321 during Fiscal Year 1971.

Resource Grants

The amended resource grant authority includes three new features:

- Deletion of the method of calculating grant amounts on the basis of previous institutional support for the library.
- Specific authority to assist in the establishment of health science libraries.
- A requirement for assurance of adequate continuing financial support from non-Federal funds.

There are two types of resource grants, a one-year $3,000 improvement grant and a one- to three-year project grant. The im-

provement grant is intended to assist in the acquisition of basic resources needed by the library and to motivate the institution to make a commitment for future library support. The project grant is intended to establish new services or improve and expand existing services.

The amended resource grant authority attracted an unusually large number of applications—462 in Fiscal Year 1971, as compared to 594 received during the five-year period under authority of the 1965 Act. Of the new applications, 292 were for improvement grants and 170 for project grants. A total in excess of $5 million was requested in these applications.

During Fiscal Year 1971 the majority of funds available was committed to the 385 continuation grants awarded under the authority of the 1965 Act. Eighty-four new awards were made for proposals submitted under the new authority. Thirty of these were project grants.

Training Grants

Specialized training programs are essential to the modern biosciences librarian, who must develop skills well beyond the traditional training. With proficiency in the use of modern technological tools and knowledge of the information needs of health workers, the librarian can better provide the health professionals with immediate access to needed information.

Summary of Extramural Programs

Program	New Grants FY 1971	Total Active Grants & Contracts
Regional Medical Library	0	10
Medical Library Resource Grants	84	469
Training Grants and Fellowships	3	23
Special Scientific Projects	1	6
Research Grants	6	51
Publications Grants	8	25
Total	102	584
Special Foreign Currency Projects	34	76
Grand Total	136	660

During 1971, 112 persons received training support from the National Library of Medicine through 17 active training grant programs.

The training opportunities for biomedical communications careers in Fiscal Year 1971 include masters' degree programs in library science, and doctorate programs in health information research and in the history of medicine. In addition there are post-doctoral research fellowships, and library internships for advanced training in information processing and medical librarianship.

Research Grants

The Library's research grants support the three program areas of biomedical library services, operations, and manpower; biomedical communication tools; and the history of medicine. Fifty-one research projects were active during the fiscal year, including six new projects.

Publications Grants

There were 16 grant-supported publications in 1971, including four new grants. Representative publications projects included a library reference work to locate the secondary literature resources for comparative and veterinary medicine; a critical review on non-chromosomal inheritance factors in higher organisms; an atlas on protein sequence and structure; and a translation of a major Russian-language book on ecology.

Special Scientific Projects

Three scholars were receiving support as of June 30, 1971, for special scientific projects related to health. One is carrying out a study of graduate professional education in occupational medicine; another is making a systems analysis of health systems; and the third is writing a comparative historical study of British colonial medical administration.

Regional Medical Libraries

The Regional Medical Library Program, reported in an earlier chapter, is part of the

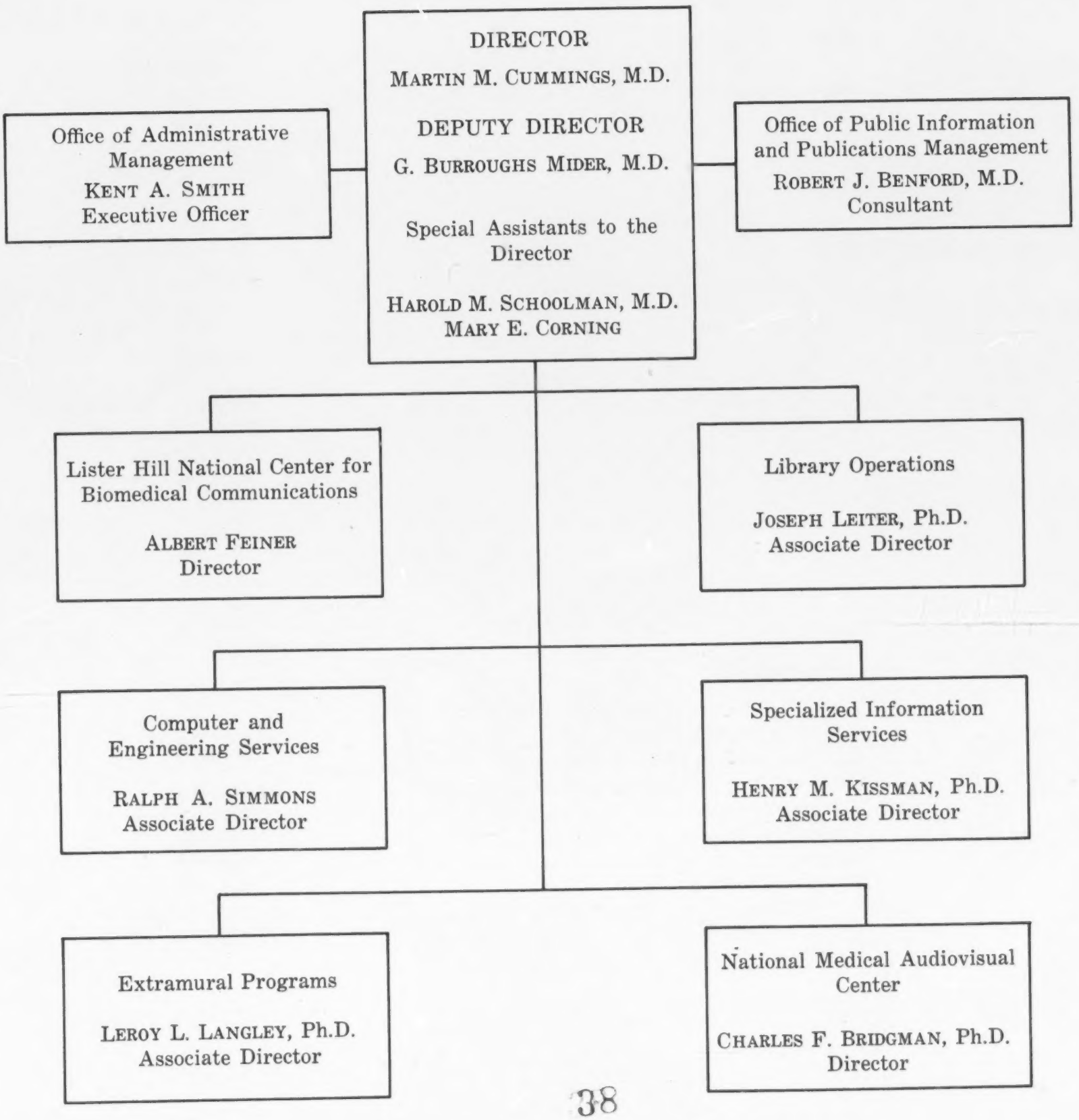
national biomedical communications network designed for information transfer to support health service delivery, education, and research. The program continues to extend cooperation between and among existing institutions by making available to them the total library resources of the Nation. Seven regional medical library programs have been transferred to the contract mechanism authorized by the 1970 Extension Act.

International Programs

The Library serves as the Department of Health, Education, and Welfare's principal resource under the Public Law 480 program for the improvement of the international exchange of biomedical information. In Fiscal Year 1971 the Library continued to sponsor a series of projects in Israel, Poland, and Yugoslavia for the preparation, translation, and publication of monographs, journals, critical reviews, histories of medicine, abstracts, and conference proceedings, and for indexing and exchange of audiovisual materials.

Eighteen new projects were activated in Israel during Fiscal Year 1971 under the Library's multicategorical Public Law 480 Agreement with the *Israel Journal of Medical Sciences*. At the close of Fiscal Year 1971, the Library also concluded a new agreement which establishes a three-year Health Sciences Research Communications Program in Poland under the auspices of the Coordinating Commission for Polish-American Scientific Collaboration. The decision was made during Fiscal Year 1971 to phase out support, after December 1972, for cover-to-cover translation and publication of biomedical journals in Yugoslavia and Poland.

Organization of National Library of Medicine



Financial Resources and Allocations
Fiscal Year 1971

Total Available for Obligation	
Appropriation, NLM	$20,769,000
Less appropriation transfer	4,000
Pay cost supplements	671,000
Earned reimbursements	195,859
	$21,631,859
Amounts Obligated by Program/Grants	
Extramural activities	
Training grants	$ 1,000,000
Special scientific project grants	5,000
Research grants	590,000
Resource grants	2,225,242
Regional medical library grants	1,885,763
Publications support grants	280,000
Subtotal, grants	$ 5,986,005
Direct Operations	
Lister Hill National Center for Biomedical Communications	$ 1,365,794
National Medical Audiovisual Center	2,295,197
Office of Computer and Engineering Services	3,307,544
Library Operations	4,501,705
Toxicology Information Program	1,310,560
Review and Approval	689,241
Program Direction	2,165,367
Subtotal, Direct Operations	$15,635,408
Total, NLM	$21,621,413

Assignment of Personnel on Duty (June 30)

	FY 1969	FY 1970	FY 1971
Office of the Director	14	11	13
Office of Public Information and Publications Management	7	5	5
Office of Administrative Management	35	30	33
Office of Computer and Engineering Services	55	53	54
Extramural Programs	30	31	34
Lister Hill National Center for Biomedical Communications	12	10	14
Specialized Information Services	18	17	16
National Medical Audiovisual Center	122	109	99
Library Operations	196	195	194
Office of Associate Director	8	8	10
Bibliographic Services Division	49	49	51
Technical Services Division	55	54	59
Reference Services Division	67	66	58
History of Medicine Division	17	18	16
Total full-time permanent positions occupied	489	461	462

Staff Awards and Honors

Mr. Jerome Barnett	Second Annual NLM Director's Award for Outstanding Contribution to the Library's Programs	Nov. 1970
Mr. Stanley Jablonski	Second Annual Regents' Award for Scholarship or Technical Achievement	June 1971
Miss Mary E. Corning	Department of Health, Education, and Welfare Superior Service Award	June 1971
Dr. Peter Olch **Mr. William Caldwell**	Public Health Service Commendation Medal for Sustained High Quality Performance While on Active Duty	June 1971

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LANGLEY, L. L.: *Review of Physiology*. 3rd ed. New York, McGraw-Hill, 1971, x, 726 pp.

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WASERMAN, M. J. and MAYFIELD, V. K.: Nicolas Chervin's yellow fever survey, 1820–1822. *J. Hist. Med.* 26:40–51, 1971.

WOOSTER, H.: The future of scientific publishing—or, What will scientists be doing for brownie points? *J. Wash. Acad. Sci.* 60:41–46, 1970.

Regional Medical Libraries

1. **New England Region** (Conn., Me., Mass., N.H., R.I., Vt.)
   Francis A. Countway Library of Medicine
   10 Shattuck St., Boston, Mass. 02115
   Librarian: Harold Bloomquist
   RML Director: Mary E. Feeney
   Telephone: 617-734-8900 X126
   TWX: 710-338-6702

2. **New York and Northern New Jersey Region** (New York and the 11 northern counties of New Jersey)
   New York Academy of Medicine Library
   2 East 103 St., New York, N.Y. 10029
   Librarian: Thomas G. Basler
   Telephone: 212-876-2531
   TWX: 710-581-6131

3. **Mid-Eastern Region** (Pa., Del., and the ten southern counties of New Jersey)
   Library of the College of Physicians
   19 South 22 St., Philadelphia, Pa. 19103
   Librarian: Elliott H. Morse
   RML Director: Carol C. Spencer
   Telephone: 215-561-6050
   TWX: 710-670-1646

4. **Mid-Atlantic Region** (Va., W. Va., Md., D.C., N.C.)
   National Library of Medicine
   8600 Rockville Pike, Bethesda, Md. 20014
   Librarian: Dr. Martin M. Cummings
   RML Director: Dr. Joseph Leiter
   Telephone: 301-496-5511
   TWX: 710-824-9615

5. **East Central Region** (Ky., Mich., Ohio)
   Wayne State University Medical Library
   4325 Brush St., Detroit, Mich. 48201
   Librarian: Dr. Vern M. Pings
   RML Director: Elizabeth G. Monroe
   Telephone: 313-577-1091
   TWX: 810-221-5163

6. **Southeastern Region** (Ala., Fla., Ga., Miss., S.C., Tenn., Puerto Rico)
   A. W. Calhoun Medical Library
   Emory University, Atlanta, Georgia 30322
   Librarian: Miriam H. Libbey
   RML Director: T. Mark Hodges
   Telephone: 404-377-9201
   TWX: 810-751-8512

7. **Midwest Region** (Ill., Ind., Iowa, Minn., N.D., Wis.)
   John Crerar Library
   35 West 33 St., Chicago, Ill. 60616
   Librarian: William S. Budington
   Telephone: 312-225-2526
   TWX: 910-221-5131

8. **Midcontinental Region** (Colo., Kans., Mo., Neb., S.D., Utah, Wyo.)
   University of Nebraska Medical Center
   42nd St. & Dewey Ave., Omaha, Nebraska 68105
   Librarian: Bernice M. Hetzner
   RML Director: Elizabeth A. Petgen
   Telephone: 402-541-4646
   TWX: 910-622-8353

9. **South Central Region** (Ark., La., N.M., Okla., Tex.)
   University of Texas Southwestern Medical School at Dallas
   5323 Harry Hines Blvd., Dallas, Texas 75235
   Librarian: Donald M. Hendricks
   Telephone: 214-631-3220
   TWX: 910-861-4946

10. **Pacific Northwest Region** (Alaska, Idaho, Mont., Oregon, Wash.)
    University of Washington
    Health Sciences Library
    Seattle, Washington 98105
    Librarian: Gerald J. Oppenheimer
    Telephone: 206-543-5530
    TWX: 910-444-1385

11. **Pacific Southwest Region** (Ariz., Calif., Hawaii, Nev.)
    Center for the Health Sciences
    University of California
    Los Angeles, California 90024
    Librarian: Louise Darling
    RML Director: Nelson J. Gilman
    Telephone: 213-825-1200
    TWX: 910-342-6897

GPO 920-199

THE BILLINGS ERA

Nearly one hundred years ago Army Surgeon General Joseph K. Barnes, in his annual report for 1873 to Secretary of War, prophetically mentioned "the interest felt by the medical profession of the country in the attempt to establish a National Medical Library worthy of the name."

Dr. John Shaw Billings

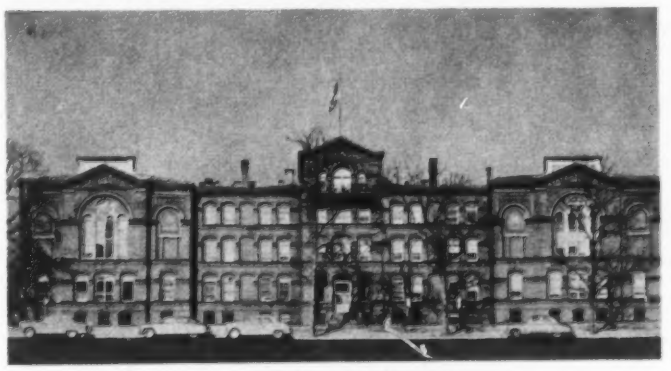
A highly professional man, Barnes had more than a passing interest in the growing collection of medical books and pamphlets already in his office when he became surgeon general. He also had the foresight to assign a rising young medical officer to his staff in 1865 and, among numerous administrative duties, to appoint him librarian. His name was John Shaw Billings, and he was to become one of the medical giants of the late nineteenth and early twentieth centuries.

Billings, who gained an international reputation in medical education, public health, hospital design and construction, and vital statistics, attained eminence in medical bibliography and librarianship during the 30 years he headed the Library. Strongly supported by Barnes, he greatly increased acquisitions by purchase, exchanges and gifts, inaugurated loans of books without fees (but required a deposit), initiated a publication program, and fought unrelentingly for a new fireproof building to house the great collection he was assembling to be a truly National Medical Library.

First Serial Publications

Billings' monumental achievement as a librarian was the conception and production of the *Index-Catalogue,* a colossal task of compiling the vast holdings of the library by subject and author in a single alphabet, to provide medical students and practitioners with access to the available literature. The first of the 16 volumes that were to comprise the first series of the *Index-Catalogue* was published in 1880. The series contained citations to 116,847 books and 191,598 pamphlets, practically all of which Billings had himself added to the Library. With his long-time associate and collaborator, Dr. Robert Fletcher, he also produced the *Index Medicus,* a continuing compilation of current literature.

By the fall of 1887 a new three-story red brick building on the south side of the Mall, designed by Billings, was completed at a cost of $200,000. This was $50,000 less than the amount originally requested and necessitated the deletion of many needed facilities and improvisation in other areas. But the task of moving the



On the Mall, 1887-1961

collection, now grown to 51,000 books and about 57,000 pamphlets, was completed in time to belatedly celebrate the Library's fiftieth anniversary in its new home.

The Library continued to grow in resources, services and prestige under the leadership of the distinguished physicians who followed Billings. In 1922 its name was changed to the Army Medical Library. Later, during an era of unification of agencies under the new Department of Defense, it was redesignated the Armed Forces Medical Library. In 1956 an amendment to the Public Health Service Act created the National Library of Medicine under the jurisdiction of the Department of Health, Education and Welfare.

NEW HORIZONS FOR MEDICAL LIBRARIES

The world's largest collection of health sciences literature of the National Library of Medicine is preserved in a modern, functional structure with an eye-catching, hyperbolic-paraboloid roof in Bethesda, Maryland, that was dedicated in 1961.

Two important factors contribute to the expanding services this great center of information and learning provides physicians and medical students, and other members of the health professions. One is the Library's international computerized system of compiling, storing and retrieving references to medical literature, known as Medlars. The other is the passage of the Medical Library Assistance Act under which, for the first time, grants are available to medical libraries to increase their resources and services. In addition, the law authorized the establishment of the Regional Medical Library Program to develop a nationwide biomedical communications network.

Medlars has also given impetus to the Library's unprecedented publications program. *Index Medicus,* which provides a monthly bibliography of current literature, and the *Current Catalog* are produced more promptly through the use of computer-driven phototypesetters. A popular new publication, *Abridged Index Medicus,* contains literature citations from the 100 most important clinical medical journals printed in English. More than a score of recurring specialized bibliographies cover many of the specialized fields of medicine.

Main Reading Room

The staff and resources of the National Medical Audiovisual Center in Atlanta, Georgia, formerly a part of the Public Health Service's Center for Communicable Diseases, in 1967 were assigned to the jurisdiction of the National Library of Medicine. By a Senate Joint Resolution in 1968, the Lister Hill National Center for Biomedical Communications was established within the National Library of Medicine. This new Center has broad research and development responsibilities in the application of computer and communication technology to medical communications, education and research.

Medlars Computer System

But great advances in communication technology and literature retrieval have not diminished the personal gratification of visiting a library to experience sensory contact with books and their contents. Here the quest for knowledge is more pleasurable and more rewarding. Recently a physician, in concluding a list of acknowledgements in a newly-published book on heart disease, wrote: "In my opinion there is no more satisfactory source of help than librarians. They always seem overjoyed to find somebody who wants to learn something."

The National Library of Medicine is such a learning place for the health professions.

NATIONAL LIBRARY OF MEDICINE

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8600 Rockville Pike
Bethesda, Maryland 20014

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

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